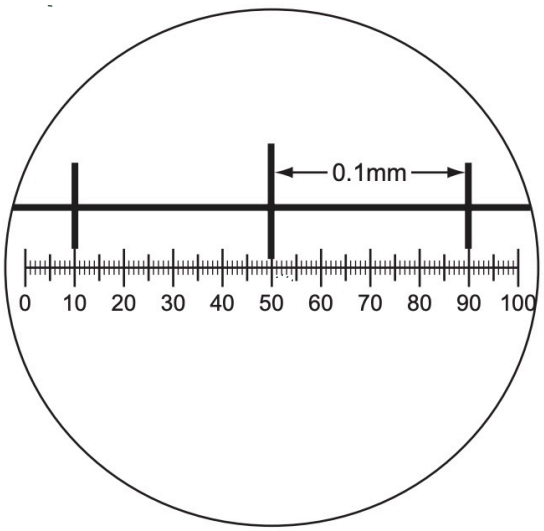
Homework Week 1

1

The diagram shows a stage micrometer viewed with an eyepiece graticule scale, using a magnification of ×400.



Using the same magnification, a chloroplast is measured and found to be 4 eyepiece graticule divisions long.

How long is the chloroplast?

A $1.0 \times 10^{1}\ \mu m$

B $4.0 \times 10^{2}\ \mu m$

C $2.5 \times 10^{-1}\ \mu m$

D $2.5 \times 10^{-2}\ \mu m$

2

The eyepiece lens of a microscope is fitted with an eyepiece graticule.

Which statements about the graticule are correct?

1 It allows you to measure the actual length of cells.

2 It allows you to draw cells with correct proportions.

3 It changes in size as the objective lens changes from ×10 to ×40.

A 1, 2 and 3 **B** 1 and 3 only **C** 1 only **D** 2 only

C

3 A light microscope is used to observe two membranes that are 200 nm apart.

How far apart are the membranes when the objective lens is changed from low power (×40) to high power (×400)?

A 2 μm **B** 20 μm **C** 200 nm **D** 2000 nm

4 The electronmicrograph is of a chloroplast.

B

The length of the chloroplast along the line shown is 80 mm. The actual length of the chloroplast is 10 μm.

What is the magnification of the chloroplast?

A $\times 8 \times 10^2$ **B** $\times 8 \times 10^3$ **C** $\times 8 \times 10^4$ **D** $\times 8 \times 10^6$

$$M = \frac{I}{A} = \frac{80 \times 10^3}{10}$$

5 Eyepiece graticules and stage micrometers are used to measure cells.

Which is the correct reason why an eyepiece graticule is calibrated?

A An eyepiece graticule can be used to make measurements.

B An eyepiece graticule is magnified by the objective lens.

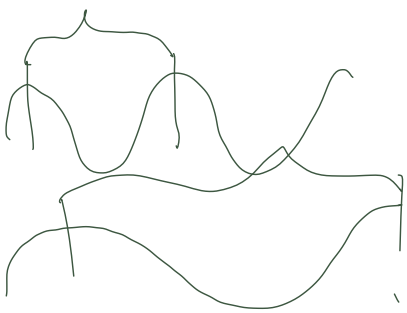
C An eyepiece graticule magnifies the specimen.

D An eyepiece graticule makes comparisons.

6 A specimen is viewed under a microscope using green light with a wavelength of 510 nm.

If the same specimen is viewed under the same conditions, but using red light with a wavelength of 650 nm instead, what effect will this have on the magnification and on the resolution of the microscope?

	magnification	resolution
A	decreased	remains the same
B	increased	increased
C	remains the same	decreased
D	remains the same	increased



7 Which statements about light microscopes are correct?

1 To calculate the magnification of a light microscope the eyepiece lens and objective lens magnifications are added together.

2 As the magnification increases the resolution decreases.

3 The resolution of a light microscope is limited by the wavelength of light.

4 The scale on a stage micrometer is resolved more clearly than an eyepiece graticule.

A 1, 2 and 3

B 1, 3 and 4

C 2 and 3 only

D 2 and 4 only

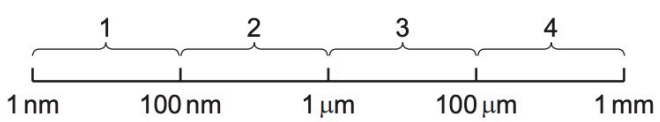
8 What best describes an electron microscope in comparison with a light microscope?

	magnification	resolution
A	higher	higher
B	higher	lower
C	lower	higher
D	lower	lower

9 At approximately which magnification is light microscopy not suitable because the resolution becomes too low?

A ×100 **B** ×200 **C** ×400 **D** ×1500

10 Which size ranges can be viewed using a light microscope?



A 4 only

B 1 and 2 only

C 2 and 3 only

D 3 and 4 only